

WETLAND MITIGATION SITE MONITORING REPORT
Harrison Avenue Extension at Pecatonica River Forest Preserve
Winnebago County, 2009

INTRODUCTION

This report details monitoring of the wetland mitigation site created to compensate for wetlands that were impacted during an extension of Harrison Avenue in Rockford, Illinois. Impacted wetlands totaled 1.82 ha (4.49 ac) in area, and included 0.66 ha (1.64 ac) of palustrine emergent wetland, 1.05 ha (2.60 ac) of forested wetland, and 0.10 ha (0.25 ac) of streambed. The compensation site is owned by the Winnebago County Forest Preserve District, and is located just south of Blair Road, adjacent to the Pecatonica River (legal location NW/4, Sect. 19, T 27N, R 10E). The site is approximately 24.3 ha (60 ac) in size, and was formerly agricultural land and a drainage ditch. Because the compensation site is located more than one mile from the impact site, a total of 7.27 ha (17.96 acres; a 4:1 ratio of compensated to impacted area) is required under the Illinois Interagency Wetland Policy Act of 1989. A total of 4.22 ha (10.44 ac) of wet prairie and emergent marsh, 2.64 ha (6.52 ac) of forested wetland, and 0.40 ha (1.00 ac) of streambed wetland were planned for the site. The planned forested wetland area is located in southernmost part of the site, adjacent to existing forest along the Pecatonica River. The planned wet prairie and marsh are located in northern part of site near Blair Road. Wetland vegetation was also planted in an existing tributary along the west side of the property. Herbaceous wetlands were planted with seeds and live plant material, and the forested site was planted with wet prairie seeds and tree saplings (Hey and Associates 1999). Wetland construction was completed in 2003. On-site monitoring was conducted in late summer from 2005 through 2009.

This report discusses the goals, objectives, and performance criteria for the mitigation project, the methods used for monitoring the site, the monitoring results from 10 August 2009, the fifth and final year of site monitoring. Methods and results are discussed by performance criteria for each goal.

Goals, Objectives, and Performance Standards

Goals, objectives, and performance standards follow those specified in the wetland compensation plan that Hey and Associates, Inc. (1999) listed for this site. Each goal should be attained by the end of the 5-year monitoring period. Goals, objectives, and performance criteria are listed below.

Project goal 1: Each wetland community should be a jurisdictional wetland as defined by current federal standards.

Objective: 4.22 ha (10.44 ac) of wet prairie and emergent marsh, 2.64 ha (6.52 ac) of forested wetland, and 0.40 ha (1.00 ac) of streambed wetland will compensate for impacts to 0.66 ha (1.64 ac) of palustrine emergent wetland, 1.05 ha (2.60 ac) of forested wetland

and 0.10 ha (0.25 ac) of streambed, at a total ratio 4 ha of wetland compensation to 1 ha of impacted wetland.

Performance criteria:

a. Predominance of hydrophytic vegetation: More than 50% of the dominant plant species must be hydrophytic.

b. Presence of wetland hydrology: The area must be either permanently or periodically inundated at average depths less than 2 m (6.6 ft) or have soils that are saturated to the surface for at least 12.5% of the growing season if hydrophytic vegetation and hydric soils are absent, or at least 5% of the growing season if hydrophytic vegetation and hydric soils are present.

c. Occurrence of hydric soils: Hydric soil characteristics should be present, or conditions favorable for hydric soil formation should persist at the site.

Project goal 2: The wetland plant community should meet minimum standards for floristic integrity and plant species composition.

Objectives: An emergent marsh, wet prairie, forested wetland, and a vegetated streambed wetland will be established by planting native wetland vegetation.

Performance criteria:

a. Floristic Quality Index: Floristic Quality Index (FQI) (Taft et al. 1997) will be greater than or equal to 20 over entire project area by fifth year of site monitoring. Native FQI will increase each successive year after planting through the end of monitoring.

b. Vegetation cover and species richness: By end of the fifth year the site will exhibit minimum of 60% vegetative cover and will include minimum of 30 native species.

c. Mean wetness coefficient: Mean native wetness coefficient (Reed 1988) will be less than or equal to zero by end of the fifth year.

d. Importance of native plant species: Relative importance value of total native plants will increase each successive year after planting.

e. Non-native and weedy species dominance: By end of fifth year no more than 20% of the area will have non-native or weedy species dominance (including *Typha* spp., *Salix interior*, and *Phragmites australis*).

Project goal 3: The forested wetland should meet minimum standards for planted tree and shrub survival.

Objectives: A forested wetland will be established by planting native trees and shrubs.

Performance criteria:

a. Percent survival of planted trees and shrubs: Planted tree and shrub survival must be at least 80% each year.

b. Number of planted tree and shrub species: The site must have at least five species of planted trees and three species of planted shrubs.

METHODS

Project goal 1

a. Predominance of hydrophytic vegetation

The method for determining dominant vegetation at a wetland site is described in the *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987). Relative cover for each species was determined by quantitatively sampling vegetation at each site (see project goal 2, below). Species were then arranged by relative cover in decreasing order, and cover values were sequentially summed, starting with the most prevalent species, until the total reached 50. Those species included in the summation were considered dominant species. Each of the dominant plant species was then assigned its wetland indicator status rating (Reed 1988). Any plant rated facultative or wetter (*i.e.*, FAC, FACW, or OBL) is considered a hydrophyte. A predominance of hydrophytic vegetation in the wetland plant community exists if more than 50% of the dominant species present are hydrophytic.

b. Presence of wetland hydrology

The extent of wetland hydrology at the Pecatonica River Forest Preserve Wetland Compensation Site was monitored by the Illinois State Geological Survey (ISGS) and is shown on the accompanying figure (Fucciolo et al. 2009). Wetland hydrology occurs when inundation or saturation to land surface is present for greater than 5% of the growing season (9 days at this site) where the soils and vegetation parameters in the Corps of Engineers Wetland Delineation Manual also are met; if either is lacking, then inundation or saturation must be present for greater than 12.5% of the growing season (23 days at this site) to satisfy wetland hydrology criteria (Environmental Laboratory 1987). Inundation and saturation at the site were monitored using a combination of 23 monitoring wells and 3 stage gauges. Water levels were measured at least biweekly during April and May, and monthly during the remainder of the year. Manual readings were supplemented by 4 dataloggers, which measure surface- and ground-water levels at regular intervals to document all hydrologic events. Additional details regarding site conditions and monitoring results for wetland hydrology in 2009 are summarized in the *Annual Report for Active IDOT Wetland Compensation and Hydrologic Monitoring Sites, September 1, 2008 to September 1, 2009* (Fucciolo et al. 2009).

c. Occurrence of hydric soils

The soil was sampled in each plant community in order to monitor hydric soil development. Soil profile morphology, including horizon color, texture, and structure, was described from one or more representative, permanent sampling points in each vegetation community. Additionally, the presence, type, size, and abundance of redoximorphic features were noted.

Hydric soils typically develop slowly, and characteristics may not be apparent during the first several years after project construction. In the absence of hydric soil indicators at the end of the five-year monitoring period, hydrologic data could be used as corroborative evidence that conditions favorable for hydric soil formation persist at the site.

Project goal 2

Vegetation in the wet prairie/emergent marsh community (hereafter referred to as Site 1) was quantitatively sampled using 0.5-m x 0.5-m (0.25 m²) quadrats (n = 29) placed every 30 m along five transects. A baseline was established along the northern boundary of the site,

parallel to Blair Road. The plant community was sampled along five parallel transects placed every 30 m (100 ft) and running north to south. Locations of these transects are marked on the enclosed map. All plant species in each quadrat were recorded and each species was assigned a cover class (Table 1), an estimate of the amount of area within the sample quadrat that is covered by that species. Data from quadrats were used to calculate frequency (percent of quadrats in which the species is present), relative frequency (frequency relative to other species), average cover per quadrat, relative cover, and Importance Value (average of relative frequency and relative cover) for each sampled species.

Table 1: Cover classes used to estimate aerial cover by plant species in sample quadrats

Cover class	Range of aerial cover	Midpoint of range
R	<1%, solitary	0%
+	<1%, seldom	0%
1	1-5%	3%
2	5-25%	15%
3	25-50%	37.5%
4	50-75%	62.5%
5	75-95%	85%
6	95-100%	97.5%

Because the forested wetland community (Site 2) has been unsuccessful in meeting goals for wetland establishment and planted tree survival, herbaceous vegetation at Site 2 was not quantitatively sampled.

In order to approximate relative species abundances in the streambed wetland (Site 3), we employed a semi-quantitative method in which all species were assigned an abundance value ranging from one to five based on visual estimates of abundance and cover. Species that were present as a single or a few individuals were assigned a value of one; species present, but uncommon were assigned a two; species which occurred at moderate frequency throughout the site were assigned a three; species which were common and abundant across the site were assigned a four; and species which were dominant at the site (greater than 20% areal cover) were assigned a five.

The Floristic Quality Assessment (Taft et al. 1997) was applied to each plant community at each site to evaluate ecological integrity. The assessment methodology is used to identify natural areas and facilitate floristic comparisons among sites. This technique is part of the procedure for the long-term monitoring of natural areas and the monitoring of restored or created wetlands (Swink and Wilhelm 1994). Plant species not native to Illinois are not included in the FQI. Each native plant species is assigned a coefficient of conservatism (*C*) ranging from 0 to 10. Lower numbers have been assigned to species that tend to be more tolerant of disturbance and higher numbers to species that are generally found in less disturbed natural areas. A mean coefficient value (*mCv*) is determined by summing the coefficients of conservatism (*C*) and dividing by the total number of native species (*N*). The Floristic Quality Index (FQI) is then determined by dividing the sum of the coefficients of conservatism by the square root of *N*. This calculation is done to incorporate numerical species diversity into the FQI value. Sites

with FQI values less than 10 suggest that the area has been highly disturbed or is in an early successional stage. Sites with FQI values of 20 or more (and mCv of 3.0 or more) generally possess some evidence of natural character and may be considered environmental assets. Sites with values of 35 or more are considered to be of natural area quality.

At each plant community the mean wetness coefficient was calculated as the average of the numerical values associated with individual species wetness coefficients for all species in the community (Reed 1988), where the numerical values are: UPL = 5, FACU- = 4, FACU = 3, FACU+ = 2, FAC- = 1, FAC = 0, FAC+ = -1, FACW- = -2, FACW = -3, FACW+ = -4, and OBL = -5.

Boundaries of the plant communities within the project area were recorded using a Trimble Global Positioning System. Locations of these sites were overlain on digital ortho-quadrangles (DOQs), and approximate wetland acreage was determined for each site using ArcView.

Project goal 3

All living planted trees and shrubs were counted and identified to species to assess survival rates.

RESULTS

Project goal 1

a. Predominance of hydrophytic vegetation

An emergent marsh/wet prairie community was planned for the northwestern portion of the project area (Site 1). Throughout the 2005 through 2009 monitoring seasons, a portion of Site 1 has consistently supported wet meadow and marsh vegetation, and is referred to as Site 1A. The remainder of Site 1, however, lacked dominant hydrophytic vegetation and hydric soils in 2005 through 2007, and is referred to as Site 1B (see Fig. 2, Appendix B). Dominant plant species for Site 1A, Site 1B, the forested site (Site 2) and the streambed wetland (Site 3) are shown in Tables 2-5. At all four sites, greater than 50% of the dominant species are rated OBL, FACW or FAC, and therefore, the dominant vegetation is hydrophytic.

Table 2. Dominant plant species by stratum for the marsh/wet meadow (Site 1A)

Dominant plant species	Stratum	Indicator status
1. <i>Phalaris arundinacea</i>	herb	FACW+

Table 3. Dominant plant species by stratum for the wet meadow (Site 1B)

Dominant plant species	Stratum	Indicator status
1. <i>Phalaris arundinacea</i>	herb	FACW+

Table 4. Dominant plant species by stratum and wetland indicator status for the forested site (Site 2)

Dominant plant species	Stratum	Indicator status
1. <i>Ambrosia trifida</i>	herb	FAC+
2. <i>Phalaris arundinacea</i>	herb	FACW+
3. <i>Polygonum pensylvanicum</i>	herb	FACW+
4. <i>Setaria faberi</i>	herb	FACU+

Table 5. Dominant plant species by stratum and wetland indicator status for the streambed wetland (Site 3)

Dominant plant species	Stratum	Indicator status
1. <i>Lemna minor</i>	herb	OBL
2. <i>Phalaris arundinacea</i>	herb	FACW+

b. Presence of wetland hydrology

Hydrologic data for the sites for September 2008 through September 2009 are presented in Appendix B. An estimated 5.3 ha (13.0 ac) within the total project area conclusively satisfied the wetland hydrology criterion for greater than 5% of the growing season during the monitoring period, and a total of 2.2 ha (5.3 ac) conclusively satisfied the wetland hydrology criterion for greater than 12.5% of the growing season (Fig. 1, Appendix B; Fucciolo et al. 2009). Site 1A, and portions of site 1B and 2, met the hydrology criterion for greater than 12.5% of the growing season.

c. Occurrence of hydric soils

Soils in the northwestern portion of the project area (Site 1) were mapped as four different soil map units (107, 242, 415, and 451) by the Natural Resources Conservation Service (NRCS) (Grantham 1980). Map unit 107 (Sawmill silty clay loam) was found in the western, wetter part of the site (Site 1A), whereas a Typic Endoaquoll appears to be developing in the eastern part of the site (Site 1B), replacing the somewhat poorly drained Orion silt loam (map unit 415). Sawmill silty clay loam is a poorly drained hydric soil formed in silty and clayey water-deposited sediments. It can be typically found on low stream terraces, in broad alluvial valleys, and in small upland drainageways. Cumulic Epiaquolls are a minority, but can be found within depressions scattered around Site 1B. Map units 242 (Kendall silt loam) and 451 (Lawson silt loam) were not found during the initial field investigation.

The NRCS mapped units 107 (Sawmill silty clay loam) and 451 (Lawson silt loam) in southern part of the project area (Site 2). Only map unit 451 was found during field investigation. Lawson silt loam is a somewhat poorly drained, non-hydric soil formed in alluvium. It is typically found on bottom lands along the Pecatonica River and along small streams and drainage ways. This year Site 2 showed signs of prolonged inundation and saturation at the base of the hill, near the river. The soil sample for the site was taken closer to the top of the hill. Drainage near the soil sample location may have been affected by the reduced drainage at the base of the hill leading to the formation of redox concentrations and a lower matrix chroma within the profile this year. It is not expected

that these features will continue to develop unless the area continues to experience wetter than normal years.

Soil within the streambed wetland (Site 3) has shown features of a hydric soil in years the soils could be examined. The areas adjacent to the stream were mapped as Sawmill silty clay loam (map unit 107). We classified the soil of the stream bottom as a Vertic Epiaquept. Again during this year's visit in August this site was under water and a soil sample was not obtained. Given the landscape position of this site within a stream channel we assume the soils are still hydric and that the profile has not changed appreciably since last year. Therefore, we report the 2007 soils description for this site in Table 10.

Typical pedons found within the project area are described below. The locations of the soil profiles used for the descriptions are marked on the enclosed map.

Table 7. Soil at Site 1A (Sawmill silty clay loam, hydric)

Depth [cm]	Matrix Color	Redox Concentrations	Redox Depletions	Texture	Structure
0 – 30	10YR 3/1	7.5YR 3/4 & 5YR 4/4	-	silt loam to silty clay loam	subangular blocky

Table 8. Soil at Site 1B (generic Typic Endoaquoll, hydric)

Depth [cm]	Matrix Color	Redox Concentrations	Redox Depletions	Texture	Structure
0 – 20	10YR 3/2	10YR 3/4	-	silt loam	subangular blocky
20 – 61	10YR 3/2	10YR 3/4	10YR 4/2	silt loam	subangular blocky
61 – 76	10YR 4/1	7.5YR 3/4 & 7.5YR 2.5/1	-	silty clay loam	subangular blocky
76 – 91	10YR 4/2	7.5YR 3/4 & 7.5YR 2.5/1	10YR 4/1	silty clay loam	subangular blocky
91-122	10YR 4/1	5YR 3/4		silty clay loam	subangular blocky

Table 9. Soil at Site 2 (Lawson silt loam, non-hydric)

Depth [cm]	Matrix Color	Redox Concentrations	Redox Depletions	Texture	Structure
0 – 46	10YR 2.5/1	-	-	silt loam	subangular blocky
46 – 91	10YR 3/2	-	-	silt loam to silty clay loam	subangular blocky
91 - 102	10YR 3/2	10YR 5/4	10YR 5/2	silt loam - loam	subangular blocky

Table 10. Soil at Site 3 (generic Vertic Epiaquept, hydric)

Depth [cm]	Matrix Color	Redox Concentrations	Redox Depletions	Texture	Structure
+20 – 0					unconsolidated materials
0 – 30	2.5Y 3/1	7.5YR 2.5/3 & 10YR 3/6	-	silt clay loam	subangular blocky

Project goal 2

Mean coefficient of conservatism and FQI values were calculated for each site from the species lists included in Appendix A. For each site, mCv and FQI values were calculated using only species that became established on the site naturally (volunteer species), and then recalculated to include planted species (Table 12). In 2009, with planted species included, the FQI exceeded the stated performance criterion of 20 for the entire project area. However, because the entire project area is large and includes several plant communities, it is likely to support a large number of native plant species regardless of the area’s floristic conservation value. An FQI value above 20 for the entire project area should not be considered exceptionally high. When considered individually, FQI and mCv values for each site suggest fair natural quality. Native FQI peaked in 2007 and has since declined. Therefore, the site failed to meet the performance standard requiring FQI to increase each year for five years.

Table 12. Mean coefficient of conservatism (mCv) and Floristic Quality Index (FQI) values for constructed wetlands

<u>a. Planted species not included</u> Site	2005		2006		2007		2008		2009	
	mCv	FQI								
1A. Wet meadow	2.3	12.9	1.9	13.0	2.2	15.9	2.3	11.4	2.3	9.7
1B. Non-native grassland	1.4	7.8	1.5	10.9	1.8	12.4	2.2	13.9	2.0	14.1
2. Forested site	1.8	11.0	1.7	10.8	2.0	13.3	2.1	11.1	1.8	12.1
3. Stream channel	2.1	11.3	2.5	13.5	2.9	12.6	2.8	12.2	2.1	9.0
TOTAL PROJECT AREA	2.1	17.9	2.0	18.9	2.2	21.2	2.5	19.5	2.1	17.4

<u>b. Planted species included</u> Site	2005		2006		2007		2008		2009	
	mCv	FQI								
1A. Wet meadow	2.8	17.7	2.4	17.7	2.6	20.6	2.7	14.9	2.6	12.8
1B. Non-native grassland	2.1	13.7	1.9	14.1	2.3	17.4	2.5	17.3	2.4	18.1
2. Forested site	2.6	19.6	2.6	19.6	2.8	22.5	2.8	17.5	2.4	18.5
3. Stream channel	2.4	13.8	2.7	15.8	2.9	15.8	3	13.9	2.4	10.9
TOTAL PROJECT AREA	2.7	27.1	2.7	28.4	2.7	30.3	2.9	25.4	2.5	23.4

Sites 1A, 1B and 2 met the performance criterion of at least 60% vegetative cover in 2009. Areal cover by bare ground was less than 5%, on average, per 0.25 m² quadrat in Sites 1A and 1B. Though not quantified in Site 2, visual observations suggested at least

60% vegetative cover. The streambed wetland had large areas of bare ground due to prolonged flooding, and had only approximately 20% vegetation coverage.

When planted species are included, 87 native plant species were observed across the entire project area, exceeding the performance criterion of 30 native species. However, the stated performance criterion is far too low for an area of this size, and is therefore not an appropriate standard for judging the floristic integrity of the area.

The project area as a whole, and each site individually, met the performance criterion of having a mean wetness coefficient less than zero (total project area: -1.53; Site 1A: -3.68; Site 1B: -1.67; Site 2: -1.34; Site 3: -2.60).

The total Importance Value of native species was 64.7 at Site 1A and 52.9 at Site 1B, indicating a large amount of cover by, and high frequency of, exotic species. Relative importance of native species in site 1B decreased from 55.9 in 2008, contrary to project objectives. However, the importance of native species at Site 1A has generally increased over time. Most of the exotic species cover in these sites is accounted for by a single species, *Phalaris arundinacea*.

The dominant species in Sites 1A and 1B, *Phalaris arundinacea*, is non-native. Two of the four dominant species at Site 2, *Phalaris arundinacea* and *Setaria faberi*, are non-native. *Phalaris arundinacea* is also one of the two dominant species in Site 3. Therefore, no sites met the performance criterion of having no more than 20% of the area with non-native or weedy species dominance.

Project goal 3

Three species of planted native trees and three species of planted native shrubs were represented by live individuals at Site 2 in August 2009 (Table 13). Therefore, the site did not meet the performance standard of having at least five species of planted trees and three species of planted shrubs. In addition, total tree and shrub survival was estimated to be only 8.3%, far below the specified performance standard of 80% survival. Heavy flooding in 2007 and 2008 appeared to have damaged or destroyed many of the planted trees and shrubs at the site.

Table 13. Planted tree and shrub survival at Site 2

Species	Number planted	Surviving 2005	Surviving 2006	Surviving 2007	Surviving 2008	Surviving 2009	Percent surviving
<i>Acer nigrum</i>	20						0.0
<i>Amelanchier arborea</i>	30	28	4	4			0.0
<i>Carya ovata</i>	20						0.0
<i>Celtis occidentalis</i>	15	7	7	14	1		0.0
<i>Cephalanthus occidentalis</i>	50	15	8	14	33	21	42.0
<i>Cornus amomum</i>	25			3	3	1	4.0
<i>Cornus stolonifera</i>	50	4	3	7	3	3	6.0
<i>Corylus americana</i>	50	11	14	2			0.0
<i>Fraxinus pennsylvanica</i>	25		17	23	6	2	8.0

Table 13. (continued)

Species	Number planted	Surviving 2005	Surviving 2006	Surviving 2007	Surviving 2008	Surviving 2009	Percent surviving
<i>Juglans nigra</i>	20	10	16	20			0.0
<i>Physocarpus opulifolius</i>	25	7	1				0.0
<i>Platanus occidentalis</i>	10	4	1	2	2		0.0
<i>Quercus bicolor</i>	25	25	13	14	4	9	36.0
<i>Quercus macrocarpa</i>	25	16	18	17	4	3	12.0
<i>Salix amygdaloides</i>	30			1			0.0
<i>Salix nigra</i>	30						0.0
<i>Tilia americana</i>	15	2	1				0.0
<i>Ulmus americana</i>	5						0.0
Total	470	129	103	121	56	39	8.3

DISCUSSION

After six years of site development since construction, these sites showed limited progress towards achievement of performance standards. Sites 1A and 3 complied with project goal 1 (establishment of a jurisdictional wetland) by the end of the monitoring period. Site 1B appears to be developing wetland indicators since 2007, possibly in response to above average precipitation and prolonged flooding from 2007-2009 (Fucciolo et al. 2007, 2008, 2009). However, because Site 1B lacked wetland hydrology in two of five monitoring years, and lacked hydric soils and dominant hydrophytic vegetation in three of five years, we do not have sufficient evidence to conclude that the site is a jurisdictional wetland. In addition, Site 2 lacked dominant hydrophytic vegetation and hydric soils in a majority of monitoring years, and is unlikely to develop these characteristics given current site conditions. Based on dominance of hydrophytic vegetation and the presence of hydric soils and wetland hydrology, we estimate that 2.02 ha of 4.22 ha (4.99 ac of 10.44 ac) at Site 1 and 0.40 ha of 0.40 ha (1.00 ac of 1.00 ac) at Site 3 conclusively met the jurisdictional criteria of a wetland in at least three of five years.

Performance with respect to project goal 2 (minimum standards for floristic integrity and species composition) was limited. Each year from 2005 through 2009 the project area as a whole has met performance standards for having an FQI above 20, when planted species are included, and for supporting greater than 30 native species. However, for an area this large these performance standards should be considered lenient, and not necessarily indicative of successful restoration. Even highly disturbed or early successional sites of this size are likely to have more than 30 native species. Contrary to the performance standard, FQI peaked in 2007 and then declined in 2008 and 2009. The relative importance of native species in most sites increased each year, but all sites were dominated by *Phalaris arundinacea* by the fifth year. All sites met the criterion of having a mean wetness coefficient less than zero, but only Sites 1A, 1B and 2 met the criterion of having greater than 60% vegetation cover. No site, however, met the criterion regarding dominance by non-native and weedy species.

Dominance of all four sites by the invasive grass *Phalaris arundinacea* was the major barrier to establishing minimum standards for floristic integrity and species composition at the sites.

Several planted herbaceous species were located at Sites 1A, 1B and 2, and planted species appeared to be spreading from the areas where they were originally planted. Continued persistence of planted herbaceous species will elevate the floristic integrity of these sites. However, following intense flood scouring and prolonged inundation in both 2007 and 2008, several planted species previously observed at these sites, as well as site 3, were not observed in 2008 or 2009.

Site 2, the forested wetland, did not meet the planted tree and shrub survival criterion for project goal 3 in any of the five years of site monitoring. Percent survival in each year was far less than the goal of 80% survival. Because this site did not meet the primary goal of creating jurisdictional wetland, it may not be practical to attempt to replant trees at this site.

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APPENDIX A: WETLAND DETERMINATION FORMS

ROUTINE ON-SITE WETLAND DETERMINATION

Site 1A (page 2 of 3)

Field Investigators: Matthews, Kurylo, Wilm and Zylka

Date: 10 August 2009

Project Name: Harrison Avenue Extension at Pecatonica

State: Illinois **County:** Winnebago **Applicant:** IDOT District 2

Site Name: Marsh/wet meadow

Legal Description: NE/4, NW/4, Sect. 19, T 27N, R 10E

Location: This site is located in northern part of the project area, just south of Blair Road.

HYDROLOGY

Inundated: Yes: X (partially) No: Depth of standing water: 0.15 m (6 in)

Depth to saturated soil: saturated at surface

Overview of hydrological flow through the system: This site receives water through precipitation, sheet flow from surrounding higher ground, a culvert under Blair Road to the north, and overflow from the Pecatonica River. Water leaves the site via evapotranspiration, soil infiltration and surface flow to Site 3.

Size of Watershed: 4429 km² (1710 mi²) (Ogata 1975)

Other field evidence observed: Wetland drainage patterns, drift accumulation

Wetland hydrology: Yes: X No:

Rationale: This site is located in a depressional area. According to a report by ISGS personnel (Fucciolo et al. 2009) this site was inundated or saturated for a sufficient duration to satisfy the wetland hydrology criterion during 2009.

DETERMINATION AND RATIONALE:

Is the site a wetland? Yes: X No:

Rationale: Dominant hydrophytic vegetation, hydric soils, and wetland hydrology have been observed in this site in five of five monitoring years. Therefore, we determined that this site is a wetland.

Determined by: Jeff Matthews, Brian Wilm and Jason Zylka
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ROUTINE ON-SITE WETLAND DETERMINATION

Site 1A (page 3 of 3)

Field Investigators: Matthews, Kurylo, Wilm and Zylka

Date: 10 August 2009

Project Name: Harrison Avenue Extension at Pecatonica

State: Illinois **County:** Winnebago **Applicant:** IDOT District 2

Site Name: Marsh/wet meadow

Legal Description: NE/4, NW/4, Sect. 19, T 27N, R 10E

Location: This site is located in northern part of the project area, just south of Blair Road.

SPECIES LIST

Scientific Name	Common Name	Stratum	Wetland indicator status	C**
<i>Acer negundo</i>	box elder	herb	FACW-	1
<i>Acer saccharinum</i>	silver maple	herb	FACW	1
† <i>Acorus calamus</i>	sweetflag	herb	OBL	4
† <i>Alisma plantago-aquatica</i>	broad-leaf water-plantain	herb	OBL	2
<i>Apocynum cannabinum</i>	dogbane	herb	FAC	2
<i>Asclepias incarnata</i>	swamp milkweed	herb	OBL	4
<i>Bidens frondosa</i>	common beggar's ticks	herb	FACW	1
<i>Bolboschoenus fluviatilis</i>	river bulrush	herb	OBL	3
<i>Celtis occidentalis</i>	hackberry	herb	FAC-	3
<i>Echinocystis lobata</i>	wild balsam-apple	herb	FACW-	4
<i>Fraxinus pennsylvanica</i>	green ash	shrub	FACW	2
† <i>Iris shrevei</i>	southern blue flag	herb	OBL	5
<i>Leersia oryzoides</i>	rice cutgrass	herb	OBL	3
<i>Lemna minor</i>	common duckweed	herb	OBL	3
<i>Phalaris arundinacea</i>	reed canary grass	herb	FACW+	*
<i>Polygonum amphibium</i>	water smartweed	herb	OBL	3
<i>Polygonum pensylvanicum</i>	giant smartweed	herb	FACW+	1
<i>Populus deltoides</i>	eastern cottonwood	shrub	FAC+	2
† <i>Sagittaria latifolia</i>	arrowhead	herb	OBL	4
<i>Salix interior</i>	sandbar willow	shrub	OBL	1
<i>Schoenoplectus tabernaemontani</i>	great bulrush	herb	OBL	4
† <i>Scirpus atrovirens</i>	dark green bulrush	herb	OBL	4
† <i>Spartina pectinata</i>	freshwater cord grass	herb	FACW+	4
<i>Typha latifolia</i>	cattail	herb	OBL	1
<i>Vitis riparia</i>	riverbank grape	vine	FACW-	2

** Coefficient of Conservatism (Taft et al. 1997)

* Non-native species

† Planted species

With planted species:

$$mCv = \sum C/N = 64/25 = 2.6$$

$$FQI = \sum C/\sqrt{N} = 64/\sqrt{25} = 12.8$$

Without planted species:

$$mCv = \sum C/N = 41/18 = 2.3$$

$$FQI = \sum C/\sqrt{N} = 41/\sqrt{18} = 9.7$$

ROUTINE ON-SITE WETLAND DETERMINATION
Site 1B (page 2 of 5)

Field Investigators: Matthews, Kurylo, Wilm and Zylka
Date: 10 August 2009
Project Name: Harrison Avenue Extension at Pecatonica
State: Illinois **County:** Winnebago **Applicant:** IDOT District 2
Site Name: Non-native grassland
Legal Description: NE/4, NW/4, Sect. 19, T 27N, R 10E
Location: This site is located in northern part of the project area, just south of Blair Road, and north of the Pecatonica River.

HYDROLOGY

Inundated: Yes: No: X Depth of standing water: N/A
Depth to saturated soil: 0.25 m (10.0 in)
Overview of hydrological flow through the system: This site receives water through precipitation and overflow from the Pecatonica River. Water leaves the site via evapotranspiration, soil infiltration and sheet flow to Site 1A and the Pecatonica River.
Size of Watershed: 4429 km² (1710 mi²) (Ogata 1975)
Other field evidence observed: Wetland drainage patterns, oxidized root channels

Wetland hydrology: Yes: X No:
Rationale: According to reports by ISGS personnel (Fucciolo et al. 2007, 2008, 2009) this site was inundated or saturated for at least 5% of the 2007, 2008 and 2009 growing seasons, but did not meet the wetland hydrology criterion in 2005 or 2006.

DETERMINATION AND RATIONALE:

Is the site a wetland? Yes: No: X
Rationale: Wetland hydrology was observed in three of the five monitoring years: 2007, 2008 and 2009. Wetland indicators have been developing at the site since 2007. However, dominant hydrophytic vegetation and hydric soils were observed in only two of five monitoring years: 2008 and 2009. Therefore, we do not have sufficient evidence to conclude that this site is a jurisdictional wetland.

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ROUTINE ON-SITE WETLAND DETERMINATION

Site 1B (page 3 of 5)

Field Investigators: Matthews, Kurylo, Wilm and Zylka

Date: 10 August 2009

Project Name: Harrison Avenue Extension at Pecatonica

State: Illinois **County:** Winnebago **Applicant:** IDOT District 2

Site Name: Non-native grassland

Legal Description: NE/4, NW/4, Sect. 19, T 27N, R 10E

Location: This site is located in northern part of the project area, just south of Blair Road, and north of the Pecatonica River.

SPECIES LIST

Scientific Name	Common Name	Stratum	Wetland indicator status	C**
<i>Abutilon theophrasti</i>	velvet-leaf	herb	FACU-	*
<i>Acer negundo</i>	box elder	tree	FACW-	1
<i>Acer saccharinum</i>	silver maple	herb	FACW	1
† <i>Acorus calamus</i>	sweetflag	herb	OBL	4
† <i>Alisma plantago-aquatica</i>	broad-leaf water-plantain	herb	OBL	2
<i>Ambrosia artemisiifolia</i>	common ragweed	herb	FACU	0
<i>Ambrosia trifida</i>	giant ragweed	herb	FAC+	0
<i>Apocynum cannabinum</i>	dogbane	herb	FAC	2
<i>Asclepias incarnata</i>	swamp milkweed	herb	OBL	4
<i>Asclepias syriaca</i>	common milkweed	herb	UPL	0
<i>Aster ontarionis</i>	Ontario aster	herb	FAC	4
<i>Bidens comosa</i>	beggar's ticks	herb	OBL	2
<i>Bidens frondosa</i>	common beggar's ticks	herb	FACW	1
<i>Bidens vulgata</i>	tall beggar's ticks	herb	FACW	0
<i>Calystegia sepium</i>	American bindweed	herb	FAC	1
<i>Campanulastrum americanum</i>	American bellflower	herb	FAC	4
<i>Carex</i> sp.	sedge	herb	----	--
<i>Conyza canadensis</i>	horseweed	herb	FAC-	0
<i>Cyperus esculentus</i>	yellow nut-sedge	herb	FACW	0
<i>Echinochloa muricata</i>	barnyard grass	herb	OBL	0
† <i>Elymus canadensis</i>	Canada wild rye	herb	FAC-	4
<i>Elymus virginicus</i>	Virginia wild rye	herb	FACW-	4
<i>Erigeron annuus</i>	annual fleabane	herb	FAC-	1
<i>Gleditsia triacanthos</i>	honey locust	herb	FAC	2
<i>Helenium autumnale</i>	autumn sneezeweed	herb	FACW+	3
<i>Hordeum jubatum</i>	squirrel-tail	herb	FAC+	*
<i>Impatiens capensis</i>	jewelweed	herb	FACW	2
† <i>Iris shrevei</i>	southern blue flag	herb	OBL	5
<i>Laportea canadensis</i>	wood nettle	herb	FACW	2
<i>Leersia oryzoides</i>	rice cutgrass	herb	OBL	3
<i>Lindernia dubia</i>	false pimpernel	herb	OBL	5
<i>Lobelia cardinalis</i>	cardinal-flower	herb	OBL	6
<i>Lycopus americanus</i>	common water horehound	herb	OBL	3

(continued on next page)

ROUTINE ON-SITE WETLAND DETERMINATION

Site 1B (page 4 of 5)

Field Investigators: Matthews, Kurylo, Wilm and Zylka

Date: 10 August 2009

Project Name: Harrison Avenue Extension at Pecatonica

State: Illinois **County:** Winnebago **Applicant:** IDOT District 2

Site Name: Non-native grassland

Legal Description: NE/4, NW/4, Sect. 19, T 27N, R 10E

Location: This site is located in northern part of the project area, just south of Blair Road, and north of the Pecatonica River.

SPECIES LIST (continued)

Scientific Name	Common Name	Stratum	Wetland indicator status	C**
<i>Lycopus virginicus</i>	bugle weed	herb	OBL	5
<i>Medicago lupulina</i>	black medic	herb	FAC-	*
<i>Melilotus albus</i>	white sweet clover	herb	FACU	*
† <i>Mimulus ringens</i>	monkey flower	herb	OBL	5
<i>Oenothera biennis</i>	evening primrose	herb	FACU	1
† <i>Panicum virgatum</i>	prairie switchgrass	herb	FAC+	4
<i>Penthorum sedoides</i>	ditch stonecrop	herb	OBL	2
<i>Phalaris arundinacea</i>	reed canary grass	herb	FACW+	*
<i>Pilea pumila</i>	Canada clearweed	herb	FACW	3
<i>Plantago rugelii</i>	red-stalked plantain	herb	FAC	0
<i>Polygonum amphibium</i>	water smartweed	herb	OBL	3
<i>Polygonum pensylvanicum</i>	giant smartweed	herb	FACW+	1
<i>Polygonum persicaria</i>	spotted lady's thumb	herb	FACW	*
<i>Polygonum scandens</i>	climbing buckwheat	herb	FAC	2
<i>Populus deltoides</i>	eastern cottonwood	shrub	FAC+	2
<i>Potentilla norvegica</i>	rough cinquefoil	herb	FAC	0
† <i>Rudbeckia hirta</i>	black-eyed Susan	herb	FACU	2
<i>Rudbeckia laciniata</i>	cutleaf coneflower	herb	FACW+	3
<i>Rumex crispus</i>	curly dock	herb	FAC+	*
† <i>Scirpus atrovirens</i>	dark green bulrush	herb	OBL	4
† <i>Scutellaria lateriflora</i>	mad-dog skullcap	herb	OBL	4
<i>Setaria faberi</i>	giant foxtail	herb	FACU+	*
<i>Setaria glauca</i>	pigeon grass	herb	FAC	*
<i>Smilax hispida</i>	bristly greenbrier	vine	FAC	3
<i>Solanum dulcamara</i>	false bittersweet	herb	FAC	*
<i>Solidago canadensis</i>	Canada goldenrod	herb	FACU	1
† <i>Solidago gigantea</i>	late goldenrod	herb	FACW	3
<i>Sonchus asper</i>	prickly sowthistle	herb	FAC	*
† <i>Spartina pectinata</i>	freshwater cord grass	herb	FACW+	4
<i>Stachys tenuifolia</i>	slenderleaf betony	herb	OBL	5
<i>Teucrium canadense</i>	American germander	herb	FACW-	3
<i>Toxicodendron radicans</i>	poison ivy	shrub	FAC+	1
<i>Tridens flavus</i>	common purple top	herb	UPL	1

(continued on next page)

ROUTINE ON-SITE WETLAND DETERMINATION
Site 1B (page 5 of 5)

Field Investigators: Matthews, Kurylo, Wilm and Zylka
Date: 10 August 2009
Project Name: Harrison Avenue Extension at Pecatonica
State: Illinois **County:** Winnebago **Applicant:** IDOT District 2
Site Name: Non-native grassland
Legal Description: NE/4, NW/4, Sect. 19, T 27N, R 10E
Location: This site is located in northern part of the project area, just south of Blair Road, and north of the Pecatonica River.

SPECIES LIST (continued)

Scientific Name	Common Name	Stratum	Wetland indicator status	C**
<i>Urtica dioica</i>	stinging nettle	herb	FAC+	2
<i>Verbena hastata</i>	blue vervain	herb	FACW+	3
<i>Verbena urticifolia</i>	white vervain	herb	FAC+	3
<i>Viola pratincola</i>	common blue violet	herb	FAC	1
<i>Vitis riparia</i>	riverbank grape	vine	FACW-	2

** Coefficient of Conservatism (Taft et al. 1997)

* Non-native species

† Planted species

With planted species:

$$mCv = \sum C/N = 139/59 = 2.4$$

$$FQI = \sum C/\sqrt{N} = 139/\sqrt{59} = 18.1$$

Without planted species:

$$mCv = \sum C/N = 98/48 = 2.0$$

$$FQI = \sum C/\sqrt{N} = 98/\sqrt{48} = 14.1$$

ROUTINE ON-SITE WETLAND DETERMINATION
Site 2 (page 2 of 5)

Field Investigators: Matthews, Kurylo, Wilm and Zylka
Date: 10 August 2009
Project Name: Harrison Avenue Extension at Pecatonica
State: Illinois **County:** Winnebago **Applicant:** IDOT District 2
Site Name: Non-native grassland (planned forested wetland)
Legal Description: S/2, NW/4, Sect. 19, T 27N, R 10E
Location: This site is located in southern part of the project area, north and west of the Pecatonica River.

HYDROLOGY

Inundated: Yes: No: X Depth of standing water: N/A

Depth to saturated soil: 0.46 m (18.0 in)

Overview of hydrological flow through the system: This site receives water through precipitation, sheet flow from adjacent higher ground, and overflow from the Pecatonica River. Water leaves the site via evapotranspiration, soil infiltration, and surface flow to the Pecatonica River.

Size of Watershed: 4429 km² (1710 mi²) (Ogata 1975)

Other field evidence observed: Wetland drainage patterns

Wetland hydrology: Yes: X (in part) No:

Rationale: According to reports by ISGS personnel (Fucciolo et al. 2007, 2008, 2009) a portion of this site was inundated or saturated for at least 5% of the growing season during 2007, 2008, and 2009. The eastern portion of the site has met the wetland hydrology criterion in three of five monitoring years.

DETERMINATION AND RATIONALE:

Is the site a wetland? Yes: No: X

Rationale: In 2009 this site had dominant hydrophytic vegetation and a portion of the site had wetland hydrology. However, the site has not consistently met the jurisdictional wetland criteria. Hydric soils were absent from the site in at least three of five monitoring years, and dominant hydrophytic vegetation was absent from the site in four of five years. Therefore, we determined that this site is not a wetland.

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ROUTINE ON-SITE WETLAND DETERMINATION

Site 2 (page 3 of 5)

Field Investigators: Matthews, Kurylo, Wilm and Zylka

Date: 10 August 2009

Project Name: Harrison Avenue Extension at Pecatonica

State: Illinois **County:** Winnebago **Applicant:** IDOT District 2

Site Name: Non-native grassland (planned forested wetland)

Legal Description: S/2, NW/4, Sect. 19, T 27N, R 10E

Location: This site is located in southern part of the project area, north and west of the Pecatonica River.

SPECIES LIST

Scientific Name	Common Name	Stratum	Wetland indicator status	C**
<i>Abutilon theophrasti</i>	velvet-leaf	herb	FACU-	*
<i>Acer negundo</i>	box elder	shrub	FACW-	1
<i>Acer saccharinum</i>	silver maple	shrub, herb	FACW	1
† <i>Acorus calamus</i>	sweetflag	herb	OBL	4
<i>Amaranthus tuberculatus</i>	tall waterhemp	herb	OBL	1
<i>Ambrosia trifida</i>	giant ragweed	herb	FAC+	0
<i>Apocynum cannabinum</i>	dogbane	herb	FAC	2
<i>Asclepias incarnata</i>	swamp milkweed	herb	OBL	4
<i>Asclepias syriaca</i>	common milkweed	herb	UPL	0
<i>Aster ontarionis</i>	Ontario aster	herb	FAC	4
<i>Bidens comosa</i>	beggar's ticks	herb	OBL	2
<i>Bidens vulgata</i>	tall beggar's ticks	herb	FACW	0
<i>Campanulastrum americanum</i>	American bellflower	herb	FAC	4
† <i>Carex vulpinoidea</i>	fox sedge	herb	OBL	3
† <i>Cephalanthus occidentalis</i>	buttonbush	shrub	OBL	4
<i>Chenopodium album</i>	lamb's quarters	herb	FAC-	*
<i>Conyza canadensis</i>	horseweed	herb	FAC-	0
† <i>Cornus amomum</i>	silky dogwood	shrub	FACW+	10
† <i>Cornus stolonifera</i>	red osier dogwood	shrub	FACW	4
<i>Cuscuta gronovii</i>	dodder	vine	FACW	2
<i>Cyperus esculentus</i>	yellow nut-sedge	herb	FACW	0
<i>Daucus carota</i>	Queen Anne's lace	herb	UPL	*
<i>Echinochloa muricata</i>	barnyard grass	herb	OBL	0
† <i>Elymus canadensis</i>	Canada wild rye	herb	FAC-	4
<i>Elymus virginicus</i>	Virginia wild rye	herb	FACW-	4
<i>Elytrigia repens</i>	quack grass	herb	FACU	*
<i>Erigeron annuus</i>	annual fleabane	herb	FAC-	1
<i>Fraxinus pennsylvanica</i>	green ash	shrub, herb	FACW	2
<i>Gleditsia triacanthos</i>	honey locust	shrub	FAC	2
<i>Hackelia virginiana</i>	stickseed	herb	FAC-	1
<i>Helenium autumnale</i>	autumn sneezeweed	herb	FACW+	3
<i>Hordeum jubatum</i>	squirrel-tail	herb	FAC+	*

(continued on next page)

ROUTINE ON-SITE WETLAND DETERMINATION

Site 2 (page 4 of 5)

Field Investigators: Matthews, Kurylo, Wilm and Zylka

Date: 10 August 2009

Project Name: Harrison Avenue Extension at Pecatonica

State: Illinois **County:** Winnebago **Applicant:** IDOT District 2

Site Name: Non-native grassland (planned forested wetland)

Legal Description: S/2, NW/4, Sect. 19, T 27N, R 10E

Location: This site is located in southern part of the project area, north and west of the Pecatonica River.

SPECIES LIST (continued)

Scientific Name	Common Name	Stratum	Wetland indicator status	C**
† <i>Iris shrevei</i>	southern blue flag	herb	OBL	5
<i>Juglans nigra</i>	black walnut	shrub	FACU	4
<i>Lactuca serriola</i>	prickly lettuce	herb	FAC	*
<i>Laportea canadensis</i>	wood nettle	herb	FACW	2
<i>Lobelia cardinalis</i>	cardinal-flower	herb	OBL	6
<i>Morus alba</i>	white mulberry	shrub	FAC	*
<i>Oenothera biennis</i>	evening primrose	herb	FACU	1
<i>Panicum capillare</i>	witch grass	herb	FAC	0
† <i>Panicum virgatum</i>	prairie switchgrass	herb	FAC+	4
<i>Penthorum sedoides</i>	ditch stonecrop	herb	OBL	2
<i>Phalaris arundinacea</i>	reed canary grass	herb	FACW+	*
<i>Polygonum amphibium</i>	water smartweed	herb	OBL	3
<i>Polygonum pensylvanicum</i>	giant smartweed	herb	FACW+	1
<i>Polygonum scandens</i>	climbing buckwheat	herb	FAC	2
<i>Populus deltoides</i>	eastern cottonwood	shrub	FAC+	2
<i>Potentilla norvegica</i>	rough cinquefoil	herb	FAC	0
† <i>Quercus bicolor</i>	swamp white oak	shrub	FACW+	7
† <i>Quercus macrocarpa</i>	bur oak	shrub	FAC-	5
† <i>Rudbeckia hirta</i>	black-eyed Susan	herb	FACU	2
<i>Rudbeckia laciniata</i>	cutleaf coneflower	herb	FACW+	3
<i>Rumex crispus</i>	curly dock	herb	FAC+	*
<i>Salix interior</i>	sandbar willow	shrub	OBL	1
<i>Sambucus canadensis</i>	common elder	shrub	FACW-	2
† <i>Scutellaria lateriflora</i>	mad-dog skullcap	herb	OBL	4
<i>Setaria faberi</i>	giant foxtail	herb	FACU+	*
<i>Solanum carolinense</i>	horse nettle	herb	FACU-	0
<i>Solanum ptycanthum</i>	black nightshade	herb	FACU-	0
<i>Solidago gigantea</i>	late goldenrod	herb	FACW	3
† <i>Spartina pectinata</i>	freshwater cord grass	herb	FACW+	4
<i>Toxicodendron radicans</i>	poison ivy	shrub	FAC+	1
<i>Tridens flavus</i>	common purple top	herb	UPL	1
<i>Ulmus americana</i>	American elm	shrub, herb	FACW-	5
<i>Verbena hastata</i>	blue vervain	herb	FACW+	3

(continued on next page)

ROUTINE ON-SITE WETLAND DETERMINATION

Site 2 (page 5 of 5)

Field Investigators: Matthews, Kurylo, Wilm and Zylka

Date: 10 August 2009

Project Name: Harrison Avenue Extension at Pecatonica

State: Illinois **County:** Winnebago **Applicant:** IDOT District 2

Site Name: Non-native grassland (planned forested wetland)

Legal Description: S/2, NW/4, Sect. 19, T 27N, R 10E

Location: This site is located in southern part of the project area, north and west of the Pecatonica River.

SPECIES LIST (continued)

Scientific Name	Common Name	Stratum	Wetland indicator status	C**
<i>Verbena urticifolia</i>	white vervain	herb	FAC+	3
<i>Vitis riparia</i>	riverbank grape	vine	FACW-	2
<i>Xanthium strumarium</i>	cocklebur	herb	FAC	0

** Coefficient of Conservatism (Taft et al. 1997)

* Non-native species

† Planted species

With planted species:

$$mCv = \sum C/N = 141/58 = 2.4$$

$$FQI = \sum C/\sqrt{N} = 141/\sqrt{58} = 18.5$$

Without planted species:

$$mCv = \sum C/N = 81/45 = 1.8$$

$$FQI = \sum C/\sqrt{N} = 81/\sqrt{45} = 12.1$$

ROUTINE ON-SITE WETLAND DETERMINATION
Site 3 (page 2 of 3)

Field Investigators: Matthews, Kurylo, Wilm and Zylka
Date: 10 August 2009
Project Name: Harrison Avenue Extension at Pecatonica
State: Illinois **County:** Winnebago **Applicant:** IDOT District 2
Site Name: Streambed wetland
Legal Description: NW/4, Sect. 19, T 27N, R 10E
Location: This site is located along the western boundary of the project area, beginning just south of Blair Road, and extending south to the Pecatonica River.

HYDROLOGY

Inundated: Yes: X No: Depth of standing water: up to 0.4 m (16 in)
Depth to saturated soil: saturated at surface
Overview of hydrological flow through the system: This site is a streambed and receives water primarily through stream flow from the north and backflow from the Pecatonica River. In addition the site receives water through precipitation and sheet flow from surrounding higher ground. Water leaves the site via evapotranspiration and stream flow into the Pecatonica River at the south end. In 2009, a beaver dam at the south end of the site increased water retention on the site.
Size of Watershed: 4429 km² (1710 mi²) (Ogata 1975)
Other field evidence observed: Wetland drainage patterns, algal mats

Wetland hydrology: Yes: X No:
Rationale: This site is located in a streambed and holds water for a long duration during the growing season. Although this site has not been monitored by the ISGS, field evidence indicates that the site was inundated or saturated for a sufficient duration to satisfy the wetland hydrology criterion during 2009.

DETERMINATION AND RATIONALE:

Is the site a wetland? Yes: X No:
Rationale: Dominant hydrophytic vegetation, hydric soils, and wetland hydrology were observed in this site in five of five monitoring years. Therefore, we determined that this site is a wetland.

Determined by: Jeff Matthews, Brian Wilm and Jason Zylka
(vegetation and hydrology)
Jessica Kurylo (soils and hydrology)
Illinois Natural History Survey
1816 S. Oak Street
Champaign, Illinois 61820
(217) 244-2168 (Matthews)

ROUTINE ON-SITE WETLAND DETERMINATION

Site 3 (page 3 of 3)

Field Investigators: Matthews, Kurylo, Wilm and Zylka

Date: 10 August 2009

Project Name: Harrison Avenue Extension at Pecatonica

State: Illinois **County:** Winnebago **Applicant:** IDOT District 2

Site Name: Streambed wetland

Legal Description: NW/4, Sect. 19, T 27N, R 10E

Location: This site is located along the western boundary of the project area, beginning just south of Blair Road, and extending south to the Pecatonica River.

SPECIES LIST

Scientific Name	Common Name	Stratum	Wetland indicator status	C**
<i>Abutilon theophrasti</i>	velvet-leaf	herb	FACU-	*
<i>Acer negundo</i>	box elder	tree	FACW-	1
<i>Acer saccharinum</i>	silver maple	tree	FACW	1
<i>Amaranthus tuberculatus</i>	tall waterhemp	herb	OBL	1
<i>Aster simplex</i>	panicked aster	herb	FACW	3
<i>Bidens comosa</i>	beggar's ticks	herb	OBL	2
<i>Bidens frondosa</i>	common beggar's ticks	herb	FACW	1
† <i>Bolboschoenus fluviatilis</i>	river bulrush	herb	OBL	3
<i>Calystegia sepium</i>	American bindweed	herb	FAC	1
<i>Cirsium arvense</i>	Canada thistle	herb	FACU	*
<i>Impatiens capensis</i>	jewelweed	herb	FACW	2
† <i>Iris shrevei</i>	southern blue flag	herb	OBL	5
<i>Leersia oryzoides</i>	rice cutgrass	herb	OBL	3
<i>Lemna minor</i>	common duckweed	herb	OBL	3
<i>Oxalis stricta</i>	yellow wood sorrel	herb	FACU	0
<i>Phalaris arundinacea</i>	reed canary grass	herb	FACW+	*
<i>Polygonum amphibium</i>	water smartweed	herb	OBL	3
† <i>Sagittaria latifolia</i>	arrowhead	herb	OBL	4
<i>Salix interior</i>	sandbar willow	shrub	OBL	1
<i>Salix nigra</i>	black willow	tree	OBL	3
<i>Scutellaria lateriflora</i>	mad-dog skullcap	herb	OBL	4
<i>Stellaria media</i>	common chickweed	herb	FACU	*
<i>Ulmus americana</i>	American elm	sapling	FACW-	5
<i>Urtica dioica</i>	stinging nettle	herb	FAC+	2
<i>Vitis riparia</i>	riverbank grape	vine	FACW-	2

** Coefficient of Conservatism (Taft et al. 1997)

* Non-native species

† Planted species

With planted species:

$$mCv = \sum C/N = 50/21 = 2.4$$

$$FQI = \sum C/\sqrt{N} = 50/\sqrt{21} = 10.9$$

Without planted species:

$$mCv = \sum C/N = 38/18 = 2.1$$

$$FQI = \sum C/\sqrt{N} = 38/\sqrt{18} = 9.0$$

APPENDIX B: VEGETATION, WETLAND AND HYDROLOGIC MAPS

Figure 1: Estimated extent of 2009 wetland hydrology within the project area (figure prepared by ISGS, from Fucciolo et al. 2009).

**Pecatonica River Forest Preserve Wetland Compensation Site
(Sequence #3746)**

Estimated Areal Extent of 2009 Wetland Hydrology

September 1, 2008 through August 31, 2009

Map based on USGS digital orthophotograph Ridott, NE quarter quadrangle

Produced from 4/8/99 aerial photography (ISGS 2005)

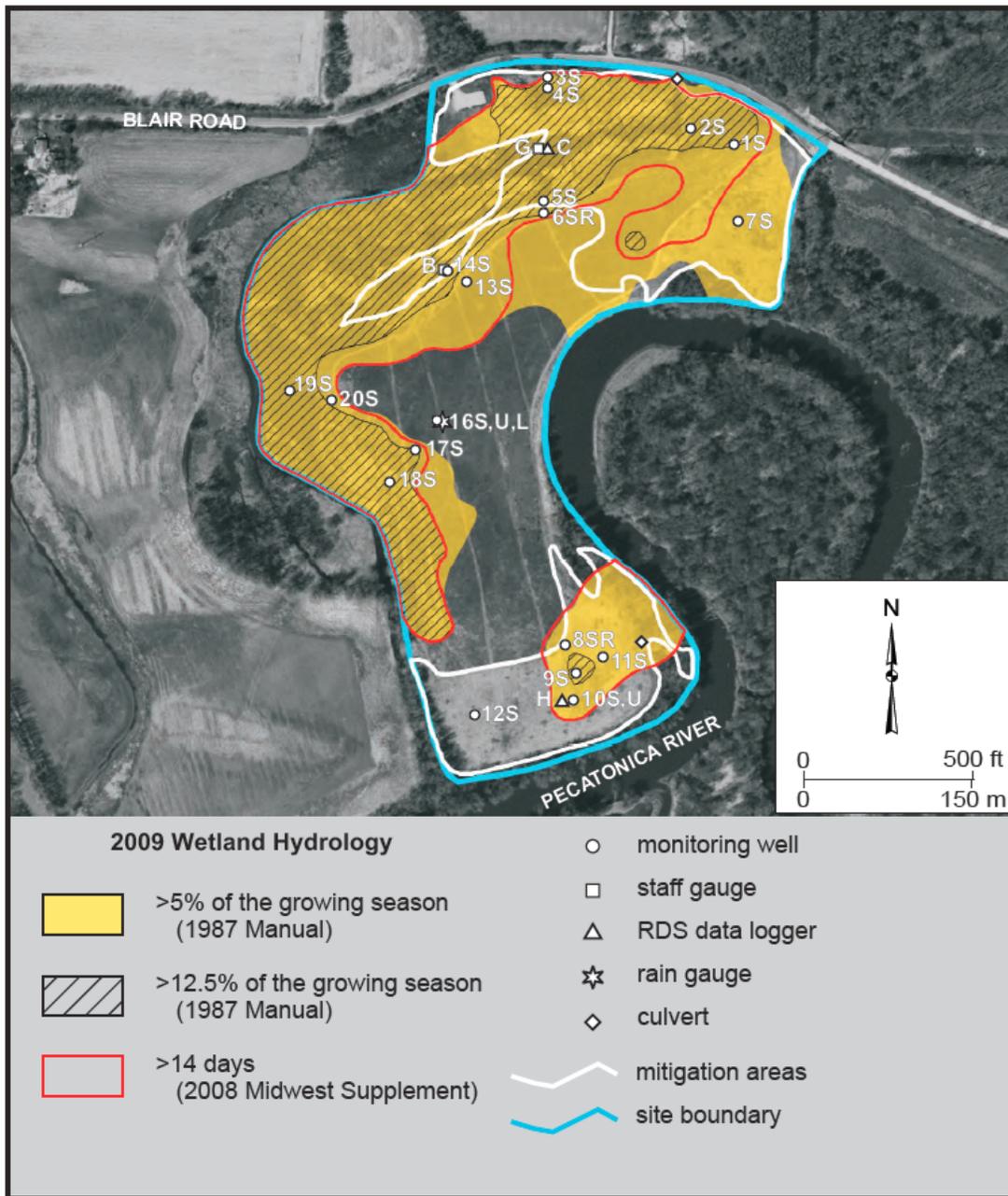
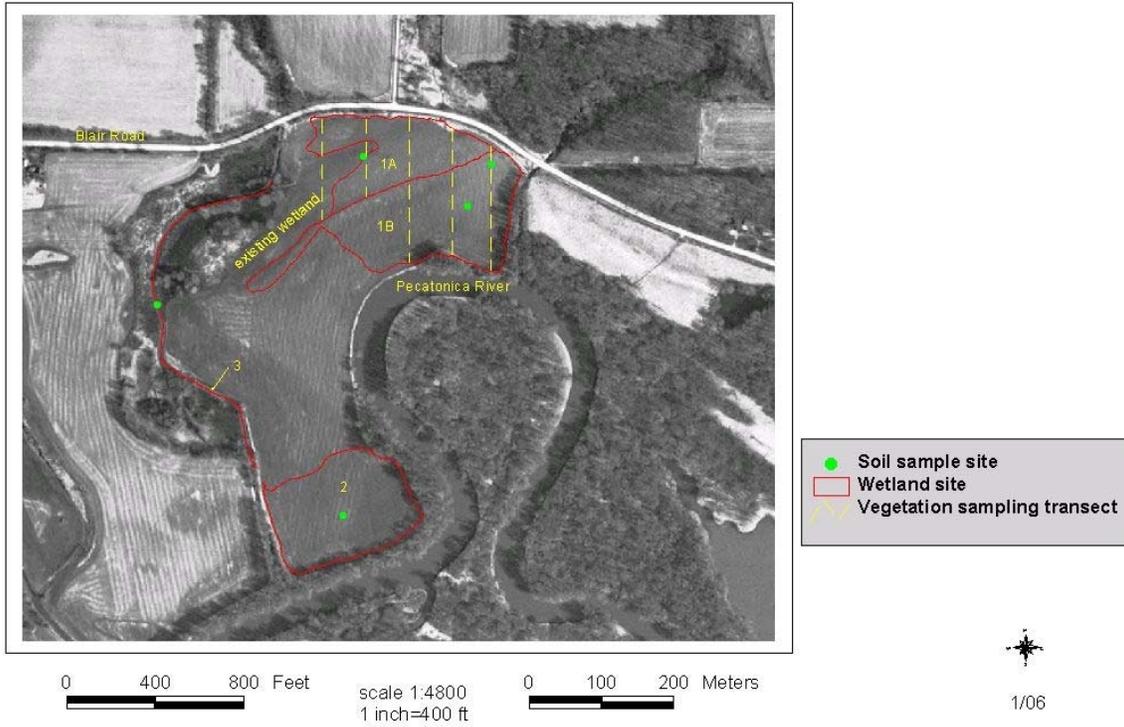


Figure 2: Locations of wetland determination sites/vegetation communities within the project area.

**Pecatonica River Forest Preserve
Mitigation Site
Winnebago County**



APPENDIX C: RESULTS OF QUANTITATIVE VEGETATION SAMPLING

Table 1: Results of 2009 quantitative vegetation sampling at Site 1A (marsh/wet meadow)

Species	Frequency	Relative frequency	Average cover	Relative cover	IV
<i>Phalaris arundinacea</i>	100.0	51.6	87.0	77.8	64.7
<i>Polygonum amphibium</i>	56.3	29.0	17.8	15.9	22.5
<i>Lemna minor</i>	12.5	6.5	6.3	5.6	6.0
<i>Acer negundo</i>	6.3	3.2	0.2	0.2	1.7
<i>Acer saccharinum</i>	6.3	3.2	0.2	0.2	1.7
<i>Bidens frondosa</i>	6.3	3.2	0.2	0.2	1.7
<i>Celtis occidentalis</i>	6.3	3.2	0.2	0.2	1.7
Sum	194	100	112	100	100

Table 2: Results of 2009 quantitative vegetation sampling at Site 1B (non-native grassland)

Species	Frequency	Relative frequency	Average cover	Relative cover	IV
<i>Phalaris arundinacea</i>	84.6	28.2	65.8	65.7	46.9
<i>Polygonum pensylvanicum</i>	38.5	12.8	7.5	7.5	10.2
<i>Echinochloa muricata</i>	23.1	7.7	10.6	10.6	9.1
<i>Potentilla norvegica</i>	23.1	7.7	4.3	4.3	6.0
<i>Acer negundo</i>	15.4	5.1	0.5	0.5	2.8
<i>Leersia oryzoides</i>	15.4	5.1	0.5	0.5	2.8
<i>Setaria faberi</i>	7.7	2.6	2.9	2.9	2.7
<i>Spartina pectinata</i>	7.7	2.6	2.9	2.9	2.7
<i>Bidens frondosa</i>	7.7	2.6	1.2	1.2	1.9
<i>Rudbeckia hirta</i>	7.7	2.6	1.2	1.2	1.9
<i>Setaria glauca</i>	7.7	2.6	1.2	1.2	1.9
<i>Acer saccharinum</i>	7.7	2.6	0.2	0.2	1.4
<i>Carex</i> sp.	7.7	2.6	0.2	0.2	1.4
<i>Cyperus esculentus</i>	7.7	2.6	0.2	0.2	1.4
<i>Lactuca serriola</i>	7.7	2.6	0.2	0.2	1.4
<i>Lindernia dubia</i>	7.7	2.6	0.2	0.2	1.4
<i>Medicago lupulina</i>	7.7	2.6	0.2	0.2	1.4
<i>Rumex crispus</i>	7.7	2.6	0.2	0.2	1.4
<i>Toxicodendron radicans</i>	7.7	2.6	0.2	0.2	1.4
Sum	300	100	100	100	100

Table 3: Results of 2009 vegetation sampling at Site 3 (streambed wetland)

Species	Commonness
<i>Lemna minor</i>	5
<i>Phalaris arundinacea</i>	5
<i>Acer saccharinum</i>	4
<i>Polygonum amphibium</i>	4
<i>Bidens frondosa</i>	3
<i>Salix nigra</i>	3
<i>Amaranthus tuberculatus</i>	2
<i>Bolboschoenus fluviatilis</i>	2
<i>Iris shrevei</i>	2
<i>Leersia oryzoides</i>	2
<i>Sagittaria latifolia</i>	2
<i>Salix interior</i>	2
<i>Ulmus americana</i>	2
<i>Vitis riparia</i>	2
<i>Abutilon theophrasti</i>	1
<i>Acer negundo</i>	1
<i>Aster lanceolatus</i> var. <i>simplex</i>	1
<i>Bidens comosa</i>	1
<i>Calystegia sepium</i>	1
<i>Cirsium arvense</i>	1
<i>Impatiens capensis</i>	1
<i>Oxalis stricta</i>	1
<i>Scutellaria lateriflora</i>	1
<i>Stellaria media</i>	1

APPENDIX D: PHOTOGRAPHS OF WETLAND MITIGATION SITE

Fig. 1. View of Site 1A from north, facing south



Fig. 2. View of Sites 1A and 1B from west side, facing northeast



Fig. 3. View of Sites 1A and 1B from northeast corner, facing south



Fig. 4. View of Site 2 from north side, facing south



Fig. 5. View of Site 2 from south side, facing north



Fig. 6. View of Site 3 from center, facing north



Fig. 7. View of Site 3 from center, facing south

